

CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

- 1 1. A method for detecting and correcting for modal dispersion in a multi-mode
2 fiber optic system having an optical signal coupled into a multi-mode fiber,
3 comprising:
4 detecting a plurality of optical signals radiating from an end of the multi-mode
5 fiber by a multisegment photodetector having different detector regions that detect
6 different portions of the plurality of optical signals; and
7 modifying detected signals by the multisegment photodetector to reduce
8 effects of modal dispersion among the plurality of optical signals.
- 1 2. The method of claim 1, wherein the modifying detected signals by the
2 multisegment photodetector is performed using weighting factors that adjust the
3 detected signals.
- 1 3. The method of claim 1, further comprising converting the plurality of optical
2 signals into at least two electrical signals and modifying at least one signal by
3 weighting factors to produce a signal that approximates a value of the optical signal
4 originally coupled into the multi-mode fiber.
- 1 4. The method of claim 1, wherein the modifying detected signals by the
2 multisegment photodetector is performed by altering bias among the multiple
3 detection regions as the weighting factor.
- 1 5. The method of claim 1, wherein the modifying detected signals by the
2 multisegment photodetector is performed using attenuation as the weighting factor.
- 1 6. The method of claim 1, wherein the modifying detected signals by the
2 multisegment photodetector is performed using amplification as the weighting factor.
- 1 7. The method of claim 1, wherein the modifying detected signals by the
2 multisegment photodetector is performed using phase shifting as the weighting factor.

1 8. The method of claim 1, wherein the modifying detected signals by the
2 multisegment photodetector is performed using delay as the weighting factor.

1 9. The method of claim 1, wherein the modifying detected signals by the
2 multisegment photodetector is performed by arbitrarily selecting the weighting
3 factors.

1 10. The method of claim 1, wherein the modifying detected signals by the
2 multisegment photodetector further comprises examining an output of the multi-
3 segment photodetector and adjusting a weighting factor until the output approximates
4 a value of the optical signal.

1 11. The method of claim 3, further comprises combining at least two signals
2 modified together in unique manners to produce an output signal.

1 12. The method of claim 1, wherein detecting a plurality of optical signals
2 radiating from an end of the multi-mode fiber by a multi-segment photodetector is
3 performed using the multisegment photodetector having at least two concentric,
4 coplanar, annular photodetectors.

1 13. The method of claim 1, wherein detecting a plurality of optical signals
2 radiating from an end of the multi-mode fiber further comprises inserting a diffractive
3 optical element between the fiber and the multisegment photodetector for modifying
4 the distribution of optical signals among the plurality of detection regions.

1 14. The method of claim 1, wherein the detecting a plurality of optical signals
2 radiating from an end of the multi-mode fiber further comprises inserting a reflective
3 optical elements between the fiber and the multisegment photodetector to modify the
4 distribution of optical signals among the plurality of detection regions.

1 15. A method for detection and compensation of multimodes produced from a
2 multimode optical fiber system, comprising:
3 converting an input electrical signal to an optical signal;
4 launching an optical signal into a multimode fiber;
5 positioning a photodetection system at an end of the multimode fiber to
6 receive a plurality of optical signals exiting the multimode fiber; detecting the
7 multiple optical signals by multiple detectors of the photodetection system producing
8 detected electrical signals;
9 modifying the detected electrical signals; and
10 adding together the detected electrical signals to generate an output electrical
11 signal corresponding to the input electrical signal.

1 16. The method of claim 15, further comprising: transmitting the optical signal
2 using an optical source selected from the group consisting of VCSEL, LED, DFB, and
3 F-P lasers.

1 17. The method of claim 16, wherein the transmitting comprises transmitting the
2 optical signal by direct modulation.

1 18. The method of claim 16, wherein the transmitting comprises transmitting the
2 optical signal by indirect modulation.

1 19. The method of claim 15, further comprising boosting of the optical signal
2 using optical amplification in any part of the multimode optical fiber system.

- 1 20. The method of claim 15, further comprising transmitting the optical signal at
2 any combination of wavelengths selected from the group consisting of 850, 1300, and
3 1550 nm and neighboring wavelengths.
- 1 21. The method of claim 15, further comprising inserting an intervening optical
2 element between the fiber and photodetection system to alter the distribution optical
3 light to the plurality of detection zones.
- 1 22. The method of claim 15, wherein modifying the detected optical signals
2 further comprises introducing a delay to any of the detected optical signals.
- 1 23. The method of claim 15, wherein modifying the detected optical signals
2 further comprises attenuating any of the detected optical signals.
- 1 24. The method of claim 15, wherein modifying the detected optical signals
2 further comprises biasing any of the detected optical signals.
- 1 25. The method of claim 15, wherein modifying the detected optical signals
2 further comprises amplifying any of the detected optical signals.
- 1 26. The method of claim 15, wherein modifying the detected optical signals
2 further comprises phase shifting any of the detected optical signals.
- 1 27. The method of claim 15, wherein modifying the detected optical signals is
2 performed using instruments selected from the group consisting of electronic,
3 semiconductor and mechanically based instruments.
- 1 28. A method for detecting and correcting for dispersion in an optical fiber system,
2 comprising:
3 detecting optical signals radiating from an end of an optical fiber by a
4 multisegment photodetector having a plurality of detection zones for detecting the
5 optical signals, the detection zones positioned adjacent to one another and arranged in
6 a coplanar, annular configuration.

1 29. The method of claim 28, further comprising modifying detected signals to
2 reduce effects of the dispersion among the detected signals.

1 30. The method of claim 28, wherein detecting optical signals radiating from an
2 end of an optical fiber is performed using a plurality of segments located within the
3 detection zones having an interdigitated, planar metal-semiconductor-metal structure.

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